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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/704,684	11/03/2000	Hang Zhang	PAT 308-2	4359

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EXAMINER

NGUYEN, TOAN D

ART UNIT	PAPER NUMBER
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2665

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/704,684

Applicant(s)

ZHANG ET AL.

Examiner

Toan D Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 16 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-2, 9 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raychaudhuri et al. (US 5,684,791).

For claim 1, Raychaudhuri et al. disclose data link control protocols for wireless ATM access channels, comprising:

(ii) receiving a reported channel condition for a forward link from the terminal (figure 10, col. 13 lines 1-36);

(iii) determining a link mode for transmission to the terminal according to the reported channel condition (figure 10, col. 13 lines 1-36); and

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(iv) scheduling (figure 2, reference 42) each of the plurality of packets in order of its respective wireless, quality of service condition, and at the determined link mode, for transmission in a physical layer frame (figures 11-13, col. 13 line 37 to col. 14 line 2).

Raychaudhuri et al. do not explicitly disclose (i) determining, on a per-packet basis, a wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal. However, Raychaudhuri et al. disclose ATM services with QoS requirements are provided on an end-to-end basis with standard ATM signaling functions being terminated at a mobile unit of a wireless network (col. 4 lines 49-51). Raychaudhuri et al. disclose further in order to overcome the effects of the inherent high error rate associated with the radio channel, a new data link control (DLC) is used in wireless ATM to provide an additional layer of error protection to ATM services. DLC protocols are not only applied to packet-mode ABR services, but also to stream-mode CBR and VBR services, with the transmission schemes matched to the requirements of the individual service classes.

Therefore, it would have been obvious to one of ordinary skill in the art to broadly interpret the determination of different types of services ABR, CBR and VBR having different QoS requirements and different priorities as the determination of the wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal.

For claim 2, Raychaudhuri et al. disclose wherein the determination of the wireless quality of service condition includes assigning a packet tag to each of the plurality of packets (figure 11, col. 13 lines 38-41).

For claim 9, Raychaudhuri et al. disclose data link control protocols for wireless ATM access channels, comprising:

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a packet tag computation unit (figure 11, reference step 200) for determining, on a per-packet basis, a wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal (col. 13 lines 38-46);

a link mode determination unit for receiving a reported channel condition for a forward link from the terminal (figure 10, col. 13 lines 1-36), and for determining a link mode for transmission to the terminal according to the reported channel condition (figure 11, col. 13 lines 1-36); and

a scheduling unit (figure 2, reference 42, col. 6 lines 34-47) for scheduling each of the plurality of packets in order of its respective wireless quality of service condition, and at the determined link mode, for transmission in a physical layer frame (figures 11-13, col. 13 line 37 to col. 14 line 2).

Raychaudhuri et al. do not explicitly disclose determining a wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal. However, Raychaudhuri et al. disclose ATM services with QoS requirements are provided on an end-to-end basis with standard ATM signaling functions being terminated at a mobile unit of a wireless network (col. 4 lines 49-51). Raychaudhuri et al. disclose further in order to overcome the effects of the inherent high error rate associated with the radio channel, a new data link control (DLC) is used in wireless ATM to provide an additional layer of error protection to ATM services. DLC protocols are not only applied to packet-mode ABR services, but also to stream-mode CBR and VBR services, with the transmission schemes matched to the requirements of the individual service classes.

Therefore, it would have been obvious to one of ordinary skill in the art to broadly interpret the determination of different types of services: ABR, CBR and VBR having different QoS requirements and different priorities as the determination of the wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal.

For claim 14, Raychaudhuri et al. disclose data link control protocols for wireless ATM access channels, comprising:

a radio transceiver for sending a physical layer frame to a terminal (figure 5, references 66 and 70, col. 8 lines 4-25), and a scheduler (figure 2, reference 42, col. 6 lines 34-47) for scheduling packets for transmission to the terminal, the scheduler having a packet tag computation unit (figure 11, reference 200) for determining, on a per-packet basis, a wireless quality of service condition for each of a plurality of packets awaiting transmission to the terminal (figure 11, col. 13 lines 38-46); a link mode determination unit for receiving a reported channel condition for a forward link from the terminal (figure 10, col. 13 lines 1-36); and for determining a link mode for transmission to the terminal according to the reported channel condition (col. 13 lines 1-36); and a scheduling unit (figure 2, reference 42) for scheduling each of the plurality of packets in order of its respective wireless quality of service condition, and at the determined link mode, for transmission in the physical layer frame (figures 11-13, col. 13 line 37 to col. 14 line 2).

Raychaudhuri et al. do not explicitly disclose determining a wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal. However, Raychaudhuri et al. disclose ATM services with QoS requirements are provided on an end-to-end basis with standard ATM signaling functions being terminated at a mobile unit of a wireless

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network (col. 4 lines 49-51). Raychaudhuri et al. disclose further in order to overcome the effects of the inherent high error rate associated with the radio channel, a new data link control (DLC) is used in wireless ATM to provide an additional layer of error protection to ATM services. DLC protocols are not only applied to packet-mode ABR services, but also to stream-mode CBR and VBR services, with the transmission schemes matched to the requirements of the individual service classes.

Therefore, it would have been obvious to one of ordinary skill in the art to broadly interpret the determination of different types of services ABR, CBR and VBR having different QoS requirements and different priorities as the determination of the wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal.

For claim 15, Raychaudhuri et al. disclose the radio transceiver is included in a base station (col. 8 lines 4-7).

4. Claims 3-5 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raychaudhuri et al. (US 5,684,791) in view of Chiussi et al. (US 6,532,213).

For claim 3-5, Raychaudhuri et al. do not disclose wherein the packet tag includes a start time and a finish time. In an analogous art, Chiussi et al. disclose wherein the packet tag includes a start time and a finish time (col. 2 lines 18-22 and col. 5 lines 26-28). Chiussi et al. disclose further wherein scheduling includes determining a deadline for each of the plurality of packets as a function of their respective start times and a current system time (col. 2 lines 17-22 as set forth in claim 4); wherein the scheduling includes scheduling the plurality of packets in order of their respective deadlines (col. 2 lines 17-22 as set forth in claim 5).

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One skilled in the art would have recognized the packet tag includes a start time and a finish time to use the teachings of Chiussi et al. in the system of Raychaudhuri et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use the packet tag includes a start time and a finish time as taught by Chiussi et al. in Raychaudhuri et al.'s system with the motivation being to provide a scheduler that maintains a queue of packets for each delay class (col. 5 lines 25-26).

For claims 10-11, Raychaudhuri et al. do not disclose wherein the packet tag computation unit determines a start time and a finish time for each of the plurality of packets, the start time and finish time being functions of the respective packet delay bound and an arrive time for each of the plurality of packets. In an analogous art, Chiussi et al. disclose wherein the packet tag computation unit (col. 7 lines 35-40) determines a start time and a finish time for each of the plurality of packets, the start time and finish time being functions of the respective packet delay bound and an arrive time for each of the plurality of packets (col. 2 lines 18-22 and col. 5 lines 26-28). Chiussi et al. disclose further wherein the scheduling unit determines a deadline for each of the plurality of packets as a function of its respective start time and a current system time (col. 2 lines 17-22 as set forth in claim 11).

One skilled in the art would have recognized the packet tag includes a start time and a finish time to use the teachings of Chiussi et al. in the system of Raychaudhuri et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use the packet tag includes a start time and a finish time as taught by Chiussi et al. in Raychaudhuri et al.'s system with the motivation being to provide a scheduler that maintains a queue of packets for each delay class (col. 5 lines 25-26).

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5. Claims 6-8 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raychaudhuri et al. (US 5,684,791) in view of Walton et al. (US 6,493,331).

For claims 6-8, Raychaudhuri et al. do not disclose wherein further packets are scheduled for transmission to other terminals. In an analogous art, Walton et al. disclose wherein further packets are scheduled for transmission to other terminals (figure 1, col. 7 lines 6-11 and col. 28 lines 55-64). Walton et al. disclose further wherein the scheduling includes determining which of the terminal and the other terminals has a best reported channel condition (figure 9, col. 29 lines 9-35 and col. 29 line 67 to col. 30 line 3 as set forth in claim 7); wherein the scheduling includes scheduling packets destined to the determined terminal before scheduling packets to a remaining terminal (figure 9, col. 29 lines 9-35 and col. 30 lines 7-17 as set forth in claim 8).

One skilled in the art would have recognized packets are scheduled for transmission to other terminals to use the teachings of Walton et al. in the system of Raychaudhuri et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use the packets are scheduled for transmission to other terminals as taught by Walton et al. in Raychaudhuri et al.'s system with the motivation being to schedule the data transmission to meet the system goals for the cells (col. 28 lines 57-58).

For claims 12-13, Raychaudhuri et al. do not disclose wherein the link mode determination unit receives a plurality of reported channel conditions for a plurality of terminals. In an analogous art, Walton et al. disclose wherein the link mode determination unit receives a plurality of reported channel conditions for a plurality of terminals (figure 9, col. 29 lines 9-35 and col. 29 line 51 to col. 30 line 3). Walton et al. disclose further wherein the scheduling unit

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considers the plurality of reported channel conditions (figure 9, col. 29 lines 9-35 and col. 29 line 58 to col. 30 27 as set forth in claim 13).

One skilled in the art would have recognized the link mode determination unit receives a plurality of reported channel conditions for a plurality of terminals to use the teachings of Walton et al. in the system of Raychaudhuri et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use the link mode determination unit receives a plurality of reported channel conditions for a plurality of terminals as taught by Walton et al. in Raychaudhuri et al.'s system with the motivation being to schedule the data transmission to meet the system goals for the cells (col. 28 lines 57-58).

Allowable Subject Matter

6. Claim 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

7. Applicant's arguments filed May 07, 2004 have been fully considered but they are not persuasive.

The applicant argues with respect to claims 1, 9 and 14, that Raychaudhuri et al. relates to ATM transmissions allocated on a frame-by-frame basis (col. 6 lines 20-24). In contrast, Applicant's invention pertains to wireless packet scheduling with allocation on a per packet basis. The examiner disagrees.

Applicant's attention is directed to Raychaudhuri et al. patent at col. 6 lines 20-24 where Raychaudhuri et al teaches "The transmission in this region are either allocated on a frame-by-

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frame basis (in the case of ABR transmissions, CBR/VBR retransmissions, and R-B acknowledgments) or pre-assigned in the case of CBR default allocation.” This region is the R-B (Remote to Base station) or uplink (col. 6 line 20). The claim invention of this application is a forward or downlink (Base station to Remote) where Raychaudhuri et al. patent clearly teaches at col. 6 lines 6-7, “The B-R data region 88 contains downlink data cells” (a per packet basis means).

Furthermore, the applicant argues that applicant’s invention is a packet based solution applicable to 3G and enhanced 3G access networks. However, the applicant fails to point out which claim is claimed this limitation.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

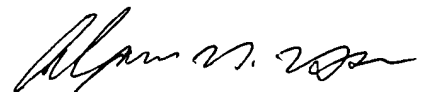
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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan D Nguyen whose telephone number is 703-305-0140. The examiner can normally be reached on Monday- Friday (7:00AM-4:30PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Huy Vu can be reached on 703-308-6602. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TU
TN



ALPUS H. HSU
PRIMARY EXAMINER